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EXAMINER

TORRES, JOSEPH D

ART UNIT	PAPER NUMBER
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2133

DATE MAILED: 04/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/756,778

Applicant(s)

GUEGUEN, ARNAUD

Examiner

Joseph D. Torres

Art Unit

2133

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 January 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The proposed drawing corrections filed 22 September 2003 are approved.
Corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings may not be deferred.

Specification

2. In view of corrections to the Specification in Amendment B of Paper No. 14, the Examiner withdraws the previous rejection to the Specification.

Response to Arguments

3. Applicant's arguments with respect to claims 1-23 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

4. Claims 1-4 and 6-23 are objected to because of the following informalities:
 - Line 8 of claim 1 recites, "a plurality of elementary coding steps associated with a plurality of interleaving steps performed in parallel or in series". The Examiner asserts that it is not clear how the "plurality of interleaving steps" are associated with the "plurality of elementary coding steps" and it is not clear whether a "plurality of interleaving steps" are even carried out in the

encoding process. Note CFR § 1.75 requires the specification “conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery”. The claim language fails to distinctly point out what the Applicant regards as his invention and although the specification teaches an embodiment of claim 1, MPEP § 2111 expressly prohibits the reading of the specification into the claim language. The Examiner assumes the Applicant intended the following: --a plurality of elementary coding steps ~~associated with~~including a plurality of interleaving steps performed in parallel or in series--.

- Lines 10-12 of claim 1 recite, “the elementary decoding steps associated with a plurality of deinterleaving steps”. The Examiner asserts that it is not clear how the “plurality of deinterleaving steps” are associated with the “elementary decoding steps” and it is not clear whether a “plurality of deinterleaving steps” are even carried out in the decoding process. The Examiner assumes the Applicant intended the following: --the elementary decoding steps ~~associated with~~including a plurality of deinterleaving steps--.
- Lines 16-18 of claim 1 recites, “the at least one characteristic quantity including a statistical function associated with the elementary decoding steps”. The Examiner asserts that it is unclear how the “statistical function” is associated with the “elementary decoding steps”. The

Art Unit: 2133

Examiner assumes the Applicant intended the following: --the at least one characteristic quantity including a statistical ~~function~~ value associated ~~with~~ for use in the elementary decoding steps--.

- Lines 20-21 recite, "a decoded information quality parameter associated with a set of decoded information items corresponding to the set of weighted output information items". The Examiner assumes the Applicant intended the following: --a decoded information quality parameter associated with a set of decoded information items ~~corresponding~~ derived from the set of weighted output information items--.
- Claim 8 does not have a period at the end of the last sentence.
- "characterizing" in claim 13 is misspelled.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-4 and 6-23 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Lines 16-18 of claim 1 recites, "the at least

one characteristic quantity including a statistical function associated with the elementary decoding steps". Nowhere in the Application does the Applicant even mention the word "statistical function". The Examiner assumes the Applicant intended the following: --the at least one characteristic quantity including a statistical ~~function~~ value associated with for use in the elementary decoding steps--.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-4 and 6-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Line 8 of claim 1 recites, "a plurality of elementary coding steps associated with a plurality of interleaving steps performed in parallel or in series". The Examiner asserts that it is not clear how the "plurality of interleaving steps" are associated with the "plurality of elementary coding steps" and it is not clear whether a "plurality of interleaving steps" are even carried out in the encoding process. The language renders claim 1 indefinite. The Examiner assumes the Applicant intended the following: --a plurality of elementary coding steps associated with including a plurality of interleaving steps performed in parallel or in series--.

Lines 10-12 of claim 1 recite, "the elementary decoding steps associated with a plurality of deinterleaving steps". The Examiner asserts that it is not clear how the "plurality of deinterleaving steps" are associated with the "elementary decoding steps" and it is not

Art Unit: 2133

clear whether a "plurality of deinterleaving steps" are even carried out in the decoding process. The language renders claim 1 indefinite. The Examiner assumes the Applicant intended the following: --the elementary decoding steps ~~associated with~~including a plurality of deinterleaving steps--.

Lines 12-13 of claim 1 recite, "each of the elementary decoding steps generating at least one weighted output information item that is transmitted to one or more other elementary decoding steps". The Examiner asserts that a decoding step is not a transmitter or receiver for receiving information items. The Examiner assumes the Applicant intended the following: --each of the elementary decoding steps generating at least one weighted output information item ~~that is transmitted to~~for use in one or more other elementary decoding steps --.

Lines 16-18 of claim 1 recites, "the at least one characteristic quantity including a statistical function associated with the elementary decoding steps". The Examiner asserts that it is unclear how the "statistical function" is associated with the "elementary decoding steps". In addition it is unclear how a characteristic quantity, which is a fixed value can include a statistical function. The language renders claim 1 indefinite. The Examiner assumes the Applicant intended the following: --the at least one characteristic quantity including a statistical ~~function~~value ~~associated with~~for use in the elementary decoding steps--.

Claim 1 recites the limitation "at least one configuration parameter" in lines 19 and 20. There is insufficient antecedent basis for this limitation in the claim. The Examiner assumes the Applicant intended the following: --~~at least one~~a configuration parameter--.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-4, 6-14, 16 and 18-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Moher; Michael I. (US 6161209 A).

35 U.S.C. 102(e) rejection of claim 1.

Moher teaches a digital transmission method with error-correcting coding (see Figure 1 and Abstract in Moher), comprising, before a step of transmitting on a channel, a coding procedure for generating, from a source information item, a coded information item comprising at least one redundant information item (col. 3, lines 44-48 in Moher teach that a plurality of digital signals, the K signals in Figure 1 of Moher, are forward error correction encoded; Note: forward error correction is a coding procedure for generating, from a source information item, a coded information item comprising at least one redundant information item) and, after the step of transmitting on the channel, a decoding procedure for obtaining, from a received information item to be decoded an estimate of the source information item with correction of transmission errors based on

Art Unit: 2133

the at least one redundant information item (estimated data b_1, \dots, b_k in Figure 1, 2 and 45 of Moher are an estimate of the source information item y_1, \dots, y_k in Figure 1 with correction of transmission errors based on the at least one redundant information item), the coding procedure comprising a plurality of elementary coding steps associated with a plurality of interleaving steps performed in parallel or in series (col. 8, lines 25-27 in Moher teach that each of the K digital signals is pseudo-randomly interleaved relative to one another at the transmitter after forward error correction encoding), the decoding procedure being iterative (col. 2, lines 57-60 in Moher teach that the decoding procedure is iterative) and comprising, for each iteration, a plurality of elementary decoding steps which correspond to the said plurality of elementary coding steps (Figures 8 and 45 in Moher teaches a K elementary decoding steps which correspond to the said K of elementary coding steps; Note: each of the K decoders in Figure 45 carry out a decoding step), the elementary decoding steps associated with a plurality of deinterleaving steps corresponding to the interleaving steps (Figure 21 is a typical decoder for each of the decoders in Figure 45 of Moher; Note: each of the decoders is includes a de-interleaver), each of the elementary decoding steps generating at least one weighted output information item that is transmitted to one or more other elementary decoding steps (col. 52, lines 41-48 in Moher teach that each previous decoding stage calculates determines a weight for use by the combining algorithm blocks in Figure 45 which uses the information to calculate new codeword estimates b_1, \dots, b_k , which are distributed to one or more other elementary decoding steps; Note: new codeword estimates b_1, \dots, b_k are weighted output information items), the method

further comprising a characteristic quantity determination step for calculating at least one characteristic quantity from a set of the weighted output information items generated in at least one of the elementary decoding steps (the log-likelihood ratio $\Lambda_1(x)$ in Figure 21 of Moher is a characteristic quantity determined from the set of the weighted output information items b_1, \dots, b_k), the at least one characteristic quantity including a statistical function associated with the elementary decoding (col. 17, lines 15-30 in Moher teach that the log-likelihood ratio $\Lambda_1(x)$ in Figure 21 of Moher is calculated from a ratio of statistical/probability functions based on the weighted output information items b_1, \dots, b_k), steps and a decoded information quality parameter determination step for determining, from the at least one characteristic quantity and at least one configuration parameter, a decoded information quality parameter associated with a set of decoded information items corresponding to the set of weighted output information items (the second BCJR decoder in Figure 21 provides a decoded information quality parameter determination step for determining, from the at least one characteristic quantity the log-likelihood ratio $\Lambda_1(x)$ in Figure 21 of Moher and at least one configuration parameter u, ζ , a decoded information quality parameter $\Lambda_2(x)$ in Figure 21 of Moher associated with a set of decoded information items $\Lambda_1(x)$ corresponding to the set of weighted output information items b_1, \dots, b_k).

35 U.S.C. 102(e) rejection of claim 2.

The decoded information quality parameter $\Lambda_2(x)$ in Figure 21 of Moher is used after the decoding procedure to determine a new estimate.

35 U.S.C. 102(e) rejection of claim 3.

The decoded information quality parameter $\Lambda_2(x)$ in Figure 21 of Moher is used during the decoding procedure as feedback to the first decoder.

35 U.S.C. 102(e) rejection of claim 4.

Moher teaches each of the elementary decoding steps uses part of the received information, which corresponds to a redundant information item associated with the corresponding elementary coding step (each of the elementary decoding steps in Figure 2 of Moher uses part of the received information, y_1, \dots, y_k , which corresponds to a redundant information item associated with the corresponding elementary coding step), for generating an output information item comprising an extrinsic information item transmitted to one or more other elementary decoding steps, at least one extrinsic information item obtained during one iteration being transmitted to another iteration ($\Lambda_2(x)$ in Figure 21 of Moher is an extrinsic information item obtained during one iteration being transmitted to another iteration transmitted to one or more other elementary decoding steps), and the characteristic quantity determination step includes calculating the at least one characteristic quantity during an elementary decoding step from a set of extrinsic information items at the output of the said elementary decoding step (Figure 21 of Moher teaches calculating the at least one characteristic quantity $\Lambda_1(x)$ during an elementary decoding step from a set of extrinsic information items ($\Lambda_2(x)$ at the output of the said elementary decoding step).

35 U.S.C. 102(e) rejection of claim 6.

Col. 17, lines 15-30 in Moher teach that the characteristic quantity $\Lambda_1(x)$ in Figure 21 of Moher is calculated from a ratio of statistical/probability functions. Probabilities are always positive hence equal to its own absolute value and are associated with an expected value. In a discrete probabilistic system with exactly one outcome, probability is substantially equal to the mean value.

35 U.S.C. 102(e) rejection of claim 7.

Col. 17, lines 15-30 in Moher teach that the characteristic quantity $\Lambda_2(x)$ in Figure 21 of Moher is completely characterized by a ratio of the statistical/probability functions.

35 U.S.C. 102(e) rejection of claim 8.

Moher teaches the decoded information quality parameter determination step determines the decoded information quality parameter $\Lambda_2(x)$ in Figure 21 of Moher from a characteristic quantity $\Lambda_1(x)$ calculated in the characteristic quantity determination step during an elementary decoding step from a set of weighted output information items b_1, \dots, b_k of the elementary decoding step and other characteristic quantities $\Lambda_1(x)$ calculated during previous elementary decoding steps from sets of weighted output information items b_1, \dots, b_k corresponding to the set of weighted output information items b_1, \dots, b_k of the elementary decoding step, and at least one configuration parameter u, ζ , the said decoded information quality parameter $\Lambda_2(x)$ being associated with a set of

Art Unit: 2133

decoded information items b_1, \dots, b_k corresponding to the set of weighted output information items b_1, \dots, b_k of the elementary decoding step.

35 U.S.C. 102(e) rejection of claim 9.

Moher teaches that the decoded information quality parameter determination step determines the decoded information quality parameter $\Lambda_2(x)$ in Figure 21 of Moher from characteristic quantities $\Lambda_1(x)$ calculated during an elementary decoding step corresponding to the last elementary decoding step in the decoding procedure (Note: $\Lambda_1(x)$ is decoded in each iteration including the last one).

35 U.S.C. 102(e) rejection of claim 10.

Moher teaches that the decoded information quality parameter determination step determines the decoded information quality parameter $\Lambda_2(x)$ in Figure 21 of Moher from a single characteristic quantity $\Lambda_1(x)$ calculated during the last elementary decoding step in the decoding procedure (Note: $\Lambda_1(x)$ is decoded in each iteration including the last one).

35 U.S.C. 102(e) rejection of claim 11.

Moher teaches that the decoded information quality parameter includes $\Lambda_2(x)$ in Figure 21 of Moher an integer number representing the probable number of errors which exist in the set of decoded information items (Col. 17, lines 15-30 in Moher teach that the characteristic quantity $\Lambda_1(x)$ in Figure 21 of Moher is calculated from a ratio of

Art Unit: 2133

probability distribution functions. Probability distribution functions represent the probable number of errors, which exist in the set of decoded information items).

35 U.S.C. 102(e) rejection of claim 12.

Moher teaches that the decoded information quality parameter includes $\Lambda_2(x)$ in Figure 21 of Moher includes a scalar used as a weighting factor (Note: the inverse of a probability in equation 13 of col. 17 in Moher is a scalar).

35 U.S.C. 102(e) rejection of claim 13.

Moher teaches that the decoded information quality parameter includes $\Lambda_2(x)$ in Figure 21 of Moher is a parameter characterizing decoding conditions, hence includes a parameter characterizing decoding conditions.

35 U.S.C. 102(e) rejection of claim 14.

Moher teaches that the decoded information quality parameter includes $\Lambda_2(x)$ in Figure 21 of Moher is a parameter characterizing transmission conditions, hence includes a parameter characterizing transmission conditions.

35 U.S.C. 102(e) rejection of claim 16.

Moher teaches that the decoded information quality parameter includes $\Lambda_2(x)$ in Figure 21 of Moher uses a predetermined algorithm allowing calculation of the decoded information quality parameter $\Lambda_2(x)$ as a function of the configuration parameters u , ζ ,

and one of more of the characteristic quantities $\Lambda_1(x)$.

35 U.S.C. 102(e) rejection of claim 18.

$N=K$ in Figures 1 and 2 of Moher.

35 U.S.C. 102(e) rejection of claim 19.

Moher teaches that the received information item is processed by means of decoding sequences y_1, \dots, y_k to provide a set of decoded information items b_1, \dots, b_k as a sequence of binary information items b_1, \dots, b_k representing a fraction of a decoding sequence.

35 U.S.C. 102(e) rejection of claim 20.

Moher teaches that Col. 17, lines 15-30 in Moher teach that the characteristic quantity $\Lambda_1(x)$ in Figure 21 of Moher is calculated from a ratio of statistical/probability functions. Probabilities are always positive hence equal to its own absolute value and are associated with an expected value. In a discrete probabilistic system with exactly one outcome, probability is substantially equal to the mean value.

35 U.S.C. 102(e) rejection of claim 21.

Col. 16, lines 47-49 and col. 17, lines 11-14 in Moher teach at least one puncturing step and the decoding procedure comprises at least one corresponding de-puncturing step.

Art Unit: 2133

35 U.S.C. 102(e) rejection of claim 22.

Moher teaches a combination of transmission methods using a number of decoding procedures associated with the same coding procedure (see Figures 1 and 2 in Moher), decoded information quality parameters $\Lambda_2(x)$ in Figure 21 of Moher obtained respectively at the end of each of the decoding procedures form weighting factors for the corresponding sets of decoded information items $\Lambda_1(x)$ used to form a weighted combination of the sets, b_1, \dots, b_k .

35 U.S.C. 102(e) rejection of claim 23.

Moher teaches a joint detection step (the two decoders in Figure 21 comprise a joint detection step), the decoded information quality parameter $\Lambda_2(x)$ in Figure 21 of Moher is used as a control parameter of the joint detection step.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

Art Unit: 2133

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claim 17 rejected under 35 U.S.C. 103(a) as being unpatentable over Moher; Michael I. (US 6161209 A).

35 U.S.C. 103(a) rejection of claim 17.

Moher substantially teaches the claimed invention described in claims 1-4, 6-14 and 16 (as rejected above). In addition, Moher teaches that the decoded information quality parameter includes $\Lambda_2(x)$ in Figure 21 of Moher uses a predetermined algorithm allowing calculation of the decoded information quality parameter $\Lambda_2(x)$ as a function of the configuration parameters u , ζ , and one of more of the characteristic quantities $\Lambda_1(x)$. However Moher does not explicitly teach the specific use of a reference table.

The Examiner asserts that use of a reference table would save space on a circuit required for a calculation unit and would provide the flexibility to change the functional aspects of the calculating unit as all software solutions do.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Moher by including use of a reference table. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of a reference table would have provided the opportunity to provide the flexibility to change the functional aspects of the calculating unit as all software solutions do.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph D. Torres whose telephone number is (703) 308-7066. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (703) 305-9595. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Joseph D. Torres, PhD
Art Unit 2133

